

**$\alpha$ -THUJONE, THE MAJOR COMPONENT OF THE ESSENTIAL OIL FROM  
*ARTEMISIA VULGARIS* GROWING WILD IN NILGIRI HILLS**

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*Artemisia vulgaris* L. occurs in a number of varieties and grows abundantly throughout the mountainous districts of India. It is frequently used in folk medicine for its stomachic deobstruent, antispasmodic, and anthelmintic properties (1,2). The volatile oil of the plant is said to be a good larvicide and feeble insecticide (3). Its leaves are also employed in popular Chinese medicine with the name of "Ai Hao" for moxibustion (4) and as a remedy for hemorrhage and diarrhea. The main component of the essential oil of *A. vulgaris* differs according to various phytogeographical origins. It has been reported (5-7) that the main constituent of the oil from Piedmont is camphor, from Poland is 1, 8-cineole, and from England is linalool, while from German origin no component of this kind has been reported. Traces of  $\alpha$ -thujone have been found in the oil of *A. vulgaris* obtained from Poikino, Villastellone, Moncaliori, and Vagilo (5).

We have investigated the oil of the Nilgiri hills near Kodaikanal using gc/ms and  $^1\text{H}$ -nmr spectroscopy and found  $\alpha$ -thujone as the main constituent (56.3%). This explains the larvicidal and insecticidal activities (3) of the essential oil from *A. vulgaris* of Indian variety. The identification of  $\alpha$ -thujone isolated by column chromatography and tlc was confirmed by comparison to the  $^1\text{H}$ -nmr spectrum of a pure sample of  $\alpha$ -thujone. The constituents of the oil of this Indian variety of *A. vulgaris*, identified by ms fragmentation and gc retention time are:  $\alpha$ -thujene (trace),  $\alpha$ -pinene (0.27%), camphene (0.45%), sabinene (trace),  $\beta$ -pinene (2.21%), myrcene (trace), limonene (0.53%), 1, 8-cineole (0.25%), *p*-cymene (3.30%),  $\alpha$ -thujone (56.3%),  $\beta$ -thujone (7.49%), camphor (3.01%), linalool (1.14%), terpinen-4-ol (trace),  $\alpha$ -terpineol (2.21%), borneol (trace), bornyl acetate (trace), geraniol (1.53%), eugenol (0.92%), caryophyllene (1.51%), and  $\gamma$ -cadinene (1.17%).

#### EXPERIMENTAL

**GENERAL EXPERIMENTAL PROCEDURE.**— $^1\text{H}$ -nmr spectra were recorded with a Varian FT80 Spectrometer with TMS as internal standard in  $\text{CDCl}_3$ . The gc/ms data was obtained with a gc Varian model 3700 coupled with ms-Varian MAT model 711 (70 eV. direct inlet) using a 25 m Chromapack cp sil 5 column programmed as initial temperature, 70° for 4 min, then 10°/min to 330°, and isothermal for 4 min with He as carrier gas. The gc work was carried out with a Perkin-Elmer 3920B gc using a Carbowax 20 packed column initially at 60° for 4 min then 4°/min to 180°, and isothermal for 16 min using  $\text{H}_2$  as carrier gas.

**PLANT MATERIALS AND ISOLATION.**—The leaves were collected in the month of October 1984, from Nilgiri hills near Kodaikanal, South India. The voucher specimen is deposited in the herbarium of the Central Institute of Medicinal and Aromatic Plants. On hydro-distillation the leaves gave a yellowish oil (1.3%,  $d^{25}_4$  0.936,  $n^{25}_D$  1.485) that yielded  $\alpha$ -thujone on column chromatography and tlc separations.

Full details of isolation and identification are available on request to the senior author.

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